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## The Effect of Competitive Outcome and Task-Involving, Ego-Involving, and Cooperative Structures on the Psychological Well-Being of Individuals Engaged in a Co-Ordination Task: A Self-Determination Approach

Martyn Standage,<sup>1,4</sup> Joan L. Duda,<sup>2</sup> and Anne Marte Pensgaard<sup>3</sup>

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*Differing task and motivational characteristics of the competitive setting (viz., task-involving/ego-involving climates, cooperative/individual, and win/loss competitive outcome) were explored in relation to need satisfaction and subjective well-being (SWB). Participants, one-on-one or in pairs, were required to participate in a physical co-ordination task. Results revealed participants exposed to a task-involving condition and those who worked in cooperation to report higher levels of need satisfaction and SWB. Conversely, individuals exposed to ego-involving conditions and those who competed individually experienced higher levels of negative affect. Winning resulted in higher levels of need satisfaction and SWB, whereas losing led to higher levels of negative affect. Losing individually in an ego-involving condition led to the highest levels of negative affect responses and attenuated levels of reported need satisfaction and SWB. Via structural equation modeling, a model of motivational processes grounded in self-determination theory was supported in which elements of the competitive situation that facilitated need satisfaction led to increments in reported indices of SWB.*

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**KEY WORDS:** competition; self-determination; well-being; competitive outcome.

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A situational factor that is inherent and potentially influential within numerous achievement-related spheres of life (e.g., education, sport, work) is *competition*. Competition has been defined as a “situation of negative interdependence among the participating individuals, so that the probability of one individual attaining a goal or receiving a reward is reduced by the presence of more capable individuals” (Ames & Ames, 1984, p. 42). Due to the various effects that competition can have on an individual’s achievement striving, the construct has held a prominent position in numerous frameworks of human motivation (see Ames, 1981; Deci & Ryan, 1985). For over 25 years, one theoretical framework that has guided empirical work examining the potential consequences of competition is *cognitive evaluation theory* (Deci & Ryan, 1980, 1985).

Cognitive evaluation theory was initially formulated by Deci (1975) as a framework to identify and synthesize empirical findings regarding the various *external* events (and later *internal events*; Ryan, 1982) that enhance versus diminish intrinsic motivation (Deci & Ryan, 1985). Now embraced as a well-articulated sub-theory within the broader organismic–dialectic framework of Self-Determination Theory (SDT; Deci & Ryan, 1985, 1991), cognitive evaluation theory posits that any event that satisfies an individual’s innate need for *competence* (need to effectively yield wanted effects and outcomes) and *autonomy* (need to be agentic, give input, and endorse activities) leads to increases in intrinsic motivation. Likewise, conditions that are not conducive towards the promotion of competence and/or are deemed controlling are theorized to thwart intrinsic interest.

Empirical work grounded in the cognitive evaluation framework has, among other external elements (e.g., monetary rewards, feedback, deadlines), indicated that the effects of and dimensions which underpin competition to be multi-faceted and complex (e.g., Reeve & Deci, 1996; Vallerand, Gauvin, & Halliwell, 1986a,b). Indeed, it has been shown that although competition can undermine motivation and yield maladaptive psychological responses, competitive situations can also foster intrinsic interest and cultivate adaptive motivational patterns (Ames & Ames, 1984; Deci & Ryan, 1985, 1992). When examining the disparate effects of competition on motivation-related indices, the physical activity domain can offer an ideal setting in which to study the competitive process. Within such settings (e.g., competitive sport), the competition between individuals is often highly salient and realized as a contest. Such *zero-sum* competition represents situations where gains by one competitor can only be obtained at the expense of another; i.e., one person/team either wins or loses the competition. Winning a competition involving a physical or sport-related task, has been shown to increase competence perceptions and intrinsic interest, whereas losing has been negatively linked to perceptions of competence and intrinsic motivation (McAuley & Tammen, 1989; Vallerand & Reid, 1984).

According to Deci and Ryan’s more recent theorizing, a focus on autonomy and competence neglects the “intrinsic social need that directs people’s interest toward the development of relational bonds and toward a concern for interpersonally

valued and culturally relevant activities” (Deci & Ryan, 1991, p. 242). Accordingly, the need for *relatedness* (need to feel connected and close with significant others) was incorporated into SDT. Implicit to SDT and the central tenet of *Basic Needs Theory* (Ryan & Deci, 2000) (a sub theory of SDT) is that the satisfaction of these needs represent the essential nutrients for psychological health and well-being.

In hypothesizing a link between need satisfaction and well-being, basic needs theory (Ryan & Deci, 2000) addresses an important outcome pertaining to all settings including those considered competitive. Indeed, a desirable motivational consequence of participation in competitive environments would be the promotion (or at least the maintaining) of an individual’s “happiness” or what can be labeled as their *subjective well-being* (SWB). SWB represents an individual’s self-evaluation of their mental state with regard to feelings of optimal experience. Consisting of three primary components (life satisfaction,<sup>5</sup> positive affect, and low levels of negative affect), SWB is considered vital for optimal functioning (Diener & Lucas, 2000).

SDT predicts that fluctuations in need satisfaction correspond to variations in SWB (Deci & Ryan, 2000; Ryan & Deci, 2001). Specifically, SDT holds that when the needs are satisfied, SWB is enhanced; yet if they are thwarted, a decrement in SWB is posited (Ryan & Deci, 2001). Research has supported the hypothesized relationship between need satisfaction and psychological well-being in business (Baard, Deci, & Ryan, 2000; Deci et al., 2001), sport (Gagné, Ryan, & Bargmann, 2003), and university (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Sheldon & Elliot, 1999) settings. When past work has explored the correlates of the satisfaction of the needs proposed by SDT in physical activity contexts, the methodologies employed have generally been cross-sectional in design (e.g., Reinboth, Duda, & Ntoumanis, 2004). Extending on this work, the present study sought to examine whether the proposed link between need satisfaction and SWB would hold in an experimental laboratory setting. Specifically, our aim was to examine whether the satisfaction (or thwarting) of the psychological needs impacts the reported positive affect, negative affect, and vitality of participants when exposed to differential competitive structures.<sup>6</sup>

<sup>5</sup>Because the experimental task consisted of two trials taking approximately a total of 20–30 min it was deemed inappropriate to assess life satisfaction as an outcome variable.

<sup>6</sup>While the majority of past studies have contrasted the effect that competitive elements have on intrinsic motivation (e.g., Reeve & Deci, 1996; Ryan, 1982), we chose to focus on the links between various competitive conditions, need satisfaction, and indices of SWB. Although such studies have been completely commensurate with cognitive evaluation theory, we found the assessment of the various motivational regulations embraced by SDT to be problematic. Indeed, during the piloting of the experimental procedure we experienced problems with our intended measure of the motivational regulations (the Situational Motivation Scale; Guay, Vallerand, & Blanchard, 2000). The problem resided with the external regulation and identified regulation subscales. Specifically, while the students informed us that they enjoyed and found the experimental task interesting they also endorsed items such as “because I feel that I have to do it” (external regulation) and “because I am doing it for my own good” (identified regulation) given the recruitment process (serving as partial fulfillment of a

Given that the psychological needs proffered by Deci and Ryan (1985, 1991, 2000) must be satisfied by one's social context to enhance SWB, understanding the situational elements that promote need satisfaction represents an important avenue of inquiry. Work from a self-determination perspective has, for the most part, focused on two dimensions of the social situation, namely *autonomy-supportive* versus *controlling* environments. During the past two decades, considerable research and writings from an achievement goal perspective (e.g., Nicholls, 1984, 1989) have provided insight into the nature of achievement contexts that can promote rather than forestall adaptive motivational processes and outcomes (cf. Ames, 1992a). Beyond a consideration of the autonomy-supportive versus controlling dimensions of the environment, we sought to integrate other (albeit related) situational structures encompassed by achievement goal theory (Nicholls, 1984, 1989) to study the effects that various competitive environments have on need satisfaction and subsequently indices of SWB. Specifically, in the present study, we attempted to create ego-involving and task-involving competitive conditions and manipulate the competitive outcome (win/loss) to examine the contrasting effects of these variables on the psychological needs proposed by Deci and Ryan (1991, 2002) and the ensuing levels of the participants' SWB. Within the experimental protocol, we also examined the effect of cooperation on need satisfaction and SWB by contrasting *individual* versus *paired* (i.e., two-person teams) competition.

We will now delineate various mechanisms through which competitive outcome and task, ego, and cooperative structures, may impact need satisfaction.

### Aspects of the Competitive Situation

#### *Competitive Outcome*

Competition inherently renders "winners" and "losers" and as such encompasses competitive outcome information. In the present study, we randomly manipulated the feedback so that one individual/two-person team won or lost both competitive trials. Previous empirical studies have shown winning on a competitive task to be an important determinant of one's intrinsic interest/motivation (McAuley & Tammen, 1989; Vallerand et al., 1986a). Indeed, past work has revealed that the effect of winning increases an individual's intrinsic motivation by enhancing perceptions of competence (Reeve & Deci, 1996; Vallerand & Reid, 1984). Information pertaining to competitive outcome may also correspond to perceived relatedness. Specifically, in examining 10 cross-lagged panel correlations from seven studies, Mullen and Copper (1994) revealed successful performance to foster a sense of cohesion. Finally, the satisfaction of the needs for competence

university course). As such, we decided not to test the motivational regulations as we felt spurious findings would emerge.

and relatedness have been shown to correspond to positive indices of SWB (Reis et al., 2000). Accordingly, we explored the hypotheses that overall need satisfaction, and feelings of positive affect and vitality would be enhanced for participants who were told that they won as opposed to those informed that they had lost the experimental trials. Further, we hypothesized that participants told that they had lost the competitive trials would report significantly higher levels of negative affect.

### *Task-Involving and Ego-Involving Competition*

Achievement goal theorists contend that the situational cues created and expressed by significant others (e.g., teachers, coaches, parents) induce different states of goal involvement and give “meaning” to achievement experiences (Ames, 1992a). It is argued that competitive situations can be perceived by the individual to be more or less task/and ego-involving. Task-involving structures refer to situational cues, which convey that improving one’s skill level and putting forth effort to master tasks represent the manner in which individuals are recognized and evaluated. Conversely, ego-involving structures refer to situations in which the evaluation and recognition of an individual is based on the winning of a competition or demonstrating superior ability compared to others. Research in a variety of contexts including education and sport has shown adaptive achievement-related responses to be linked to perceived task-involving, rather than ego-involving, climates (see Ames, 1992a; Ntoumanis & Biddle, 1999).

Task and ego involving elements of the competitive environment are assumed to have contrasting effects on a sense of personal autonomy (Deci & Ryan, 1985). Task-involving situations support self-referenced gains, the putting forth of effort and provide individuals with choice. As such, they are considered to be more self-determining (Ryan & Deci, 1989). Due to individuals possessing enhanced personal control pertinent to task-related outcomes, task-involving situations are expected to enhance individuals’ perceptions of autonomy. Research has supported this hypothesis by revealing task-involving environments to be facilitative of perceived autonomy in a variety of contexts including physical education (Standage, Duda, & Ntoumanis, 2003) and sport (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002). In contrast, ego-involving environments emphasize comparison with others and are assumed to be more controlling (Deci & Ryan, 1985; Ryan, 1982). When exposed to an ego-involving climate, one’s sense of self is more likely to hinge on the demonstration of superior performance (Reinboth & Duda, 2004; Ryan, 1982). Accordingly in such situations, perceptions of personal control are compromised as the regulation of behavior is externally directed (i.e., reflective of “pawn motivation”) (deCharms, 1968). Previous work has shown that when participants feel pressured to win (an attribute of an ego-involving climate) as opposed to being told

to just try their best (a feature of a task-involving environment), their intrinsic motivation towards a task decreases (Ryan, 1982) and this effect seems to evolve through the suppression of the participants' level of autonomy (Reeve & Deci, 1996).

In addition to the need for autonomy, SDT asserts that the need for competence is pertinent to enhanced SWB. It is important to note that, the manner in which individuals "evaluate their performance is first and foremost a function of whether they perceive themselves as successful or not" (Ames, 1984, p. 178). Research has demonstrated that individuals who perceive that they have performed well are more likely, even if they have been objectively unsuccessful, to report greater levels of intrinsic motivation than those who perceived failure (McAuley & Tammen, 1989). In a task-involving climate, individuals are assumed to use more self-referenced criteria to judge their subjective success. Thus, as the focus in such an environment is on personal improvement and doing one's best rather than being the best, perceptions of adequate competence should be maintained (cf. Duda, 2001). Past work has supported a positive relationship between perceptions of a task-involving climate and perceived competence (e.g., Sarrazin et al., 2002).

Drawing from previous work, whether individuals perceive the competitive environment to be more or less task and/or ego involving would be expected to be associated with perceptions of relatedness. Research has shown that in task-involving climates, subjective success is derived from both trying hard and working well with others (Ames & Ames, 1984; Seifriz, Duda, & Chi, 1992). Thus, it is not surprising that a recent investigation found perceptions of a task-involving climate to be positively associated with perceived relatedness in a sport setting (Sarrazin et al., 2002). In contrast, because ego-involving climates are marked by social comparison, it is likely that individuals will focus on their ability as it relates to their peers rather than center on the quality of their relationships with others. In an ego-involving climate, intra-individual rivalry is emphasized and differential treatment for high and low ability individuals is perceived (Newton, Duda, & Yin, 2000; Papaioannou, 1995).

Given the aforementioned evidence and proposed theoretical links, we hypothesized that perceptions of a task-involving climate would be linked to enhanced need satisfaction. Conversely, we expected that perceptions of an ego-involving situation would be negatively related to need satisfaction. With respect to SWB, Nix, Ryan, Manly, and Deci (1999) recently found subjective vitality to be enhanced in a task-involving condition as opposed to one rich in ego-involving features. As such, we tested the hypotheses that overall need satisfaction, and associated feelings of positive affect and vitality would be enhanced for participants who were exposed to a task-involving climate, whereas those exposed to an ego-involving climate would report significantly higher scores for negative affect.

*Cooperative Competition*

A cooperative structure refers to situations in which separate individuals share and work together towards a common goal (Ames, 1984). Similar to task-involving climates, a cooperative structure emphasizes effort and working with, rather than against, others (Ames & Ames, 1984). With regard to SWB, past work has shown a cooperative structure to result in greater psychological health when compared to competing against others or working independently (Johnson & Johnson, 1989, 1998).

Although SDT holds that satisfying the need for relatedness engenders feelings of SWB (Ryan & Deci, 2001), little work has explored the competitive structures that may promote relatedness above and beyond the effects incurred by task versus ego involving and autonomy versus controlling elements of the situation. To this end, it is likely that a cooperative structure will be particularly associated with enhanced perceptions of relatedness. In a cooperative situation, individuals are more likely to assist, instruct, encourage, and facilitate each other's efforts to reach a common goal (Johnson & Johnson, 1989).

Learning in small groups also allows students to perceive more control over and input pertaining to their learning and as such is likely to be positively associated with enhanced perceptions of autonomy (Ames, 1992b). Additionally, research has shown that cooperative learning can have a positive influence on perceptions of ability (cf. Johnson & Johnson, 1989). Specifically, in cooperative settings, individuals' self-evaluation cannot be predicted solely by their personal achievement (Ames & Ames, 1984). When working together, individuals tend to interact, give feedback, and promote each other's success (Johnson & Johnson, 1989). Thus, we hypothesized that perceiving a cooperative situation would positively enhance need satisfaction, positive affect, vitality, and lead to decrements in negative affect.

It is important to note that the task and ego involving two-person team conditions differed in their cooperative features. Both situations involved individuals working together towards a common goal (Ames, 1984). In the task-involving two-person team condition, however, greater provision was made for the participants to co-ordinate their efforts, trying their best as opposed to focussing on the outcome was emphasized, collective improvement across trials was stressed, and feedback was provided privately as opposed to publicly. Conversely, in the ego-involving two-person team condition, the efforts of the participants were combined to compete against the opposing team, winning was emphasized, and feedback was provided publicly as opposed to privately.

In sum, one aim of the present study was to examine the effect of competitive structures and competitive outcome on need satisfaction and SWB. To allow us to test our theoretical predictions, we compared four experimental conditions; namely an ego-involving individual competition, an ego-involving two-person



team [cooperative] competition, a task-involving individual competition, and a task-involving two-person team [cooperative] competition. In each condition, positive versus negative (win/loss) competitive feedback was randomly administered.

Via structural equation modeling (SEM), the second purpose was to examine a model of motivational processes grounded in SDT (Deci & Ryan, 1985, 1991). Specifically, we hypothesized that (a) cooperation and competitive outcome conditions would positively predict, whereas an ego-involving (or controlling interpersonal)<sup>7</sup> condition would negatively predict, need satisfaction (b) aligned with basic needs theory, need satisfaction would positively predict positive affect and vitality and negatively predict negative affect, and (c) variations in the created competitive conditions would impact indices of SWB through need satisfaction. Finally, given that positive affect and vitality both represent markers of positive SWB and have been shown to be moderately correlated in past work (e.g., Reis et al., 2000), we allowed their disturbance terms to correlate.

### Supplementary Analyses: When is Losing Worse?

In the present study, we also chose to explore the question of *when is losing most detrimental to need satisfaction and indices of SWB?* Drawing from the literature, we examined, via planned contrasts, three theory-driven hypotheses (see Table I). First, we hypothesized that participants who lost in an ego-involving condition would report significantly higher negative affect and significantly lower need satisfaction, positive affect and vitality than those who lost in a task-involving condition (Contrast 1). Next, we hypothesized that losing in an individual condition would significantly increase perceptions of negative affect and lead to significant decrements in need satisfaction, positive affect, and vitality when compared to losing in a two-person team (Contrast 2). Finally, we hypothesized that losing within an ego-involving individual condition would result in significantly higher levels of negative affect and lower reported need satisfaction, positive affect, and vitality when contrasted with losing in an ego-involving two-person team (Contrast 3).

## METHOD

### Participants

A total of 183 undergraduate students from a British University volunteered to participate in the study for partial fulfillment of a course requirement. After the deletion of one case due to missing data, and two cases that were identified

<sup>7</sup>Because the task- and ego-involving variable was categorical we chose to explore the effect of an ego-involving condition in the path model. Identical paths (but positive) would emerge for the task-involving condition.

Table I. Planned A Priori Contrast Weights and Mean Values for the Dependent Variables by Experimental Condition

Outcome	Competition type									
	Ego-involving individual		Ego-involving two-person team		Task-involving individual		Task-involving two-person team		Sum of weights	
	Win ( <i>n</i> = 22)	Lose ( <i>n</i> = 20)	Win ( <i>n</i> = 24)	Lose ( <i>n</i> = 23)	Win ( <i>n</i> = 23)	Lose ( <i>n</i> = 18)	Win ( <i>n</i> = 25)	Lose ( <i>n</i> = 25)		
Contrast										
(1) Losing in an ego-involving climate versus a task-involving climate	0	-1	0	-1	0	1	0	1	0	0
(2) Losing in an individual condition versus a two-person team condition	0	-1	0	1	0	-1	0	1	0	0
(3) Losing in an ego-involving individual condition versus losing in an ego-involving two-person team condition	0	-1	0	1	0	0	0	0	0	0
Mean values for each group, M										
Need satisfaction	5.22	4.34	5.29	4.76	5.14	4.59	5.60	5.02	5.02 <sup>a</sup>	
Positive affect	4.60	3.78	4.95	4.57	4.74	4.56	4.88	4.49	4.59 <sup>a</sup>	
Negative affect	1.87	2.41	1.68	1.98	1.55	1.93	1.78	1.70	1.85 <sup>a</sup>	
Vitality	4.55	3.45	4.77	4.10	4.68	4.08	5.19	4.45	4.44 <sup>a</sup>	

<sup>a</sup>Total mean, M.

as multivariate outliers (extreme scores on the Mahalanobis distance criterion,  $p < .001$ ), the sample consisted of 180 participants (106 females and 74 males;  $M$  age = 19.99;  $SD$  = 1.60, range = 18–32 years).

## Experimental Task

The dance/co-ordination computer game “Let’s Dance Europe Vol. 1” (Foremed Europe Ltd.) served as the experimental task. This co-ordination-based task requires the participant to stand in the middle of a pad surrounded by several sensor pads. When the computer program is initiated, targets are generated on the computer screen. These targets ascend up the computer display, and at the appropriate time the participant is required to move his/her feet to hit the appropriate sensor pad in accordance with the indicated location.

## Measures

### *Need Satisfaction*

To assess the degree to which the participants experienced need satisfaction, three previously validated questionnaires were employed. The three subscales were averaged to provide a composite variable labeled *need satisfaction*. Further, scores from the three subscales were used as indicators for the latent factor *need satisfaction* in the SEM analysis.

The participants’ sense of autonomy was measured using 5 modified items from the work of Standage and Associates (2003). Example items include “I participated in the task because I wanted to” and “I had to force myself to do the task.” Perceived competence was assessed using the 5-item perceived competence subscale of the 18-item Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen, 1989). In the present study, the stem and items of this subscale were reworded to target the co-ordination task. Relatedness was assessed using the acceptance subscale of the Feelings of Relatedness Scale (Richer & Vallerand, 1998). In the present study the stem was modified to ask the question “In today’s experiment I felt . . .” to which the participants responded to five items such as “close,” “valued,” and “supported.” Responses for all the need satisfaction items were made on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). In the present work, alpha coefficients for the autonomy, competence, and relatedness subscales were .71, .93, and .85, respectively.

Results of a confirmatory factor analysis (CFA) provided support for the factorial validity of the need satisfaction measurement model [ $\chi^2(87) = 146.12$ ,  $p < .001$ ; CFI = .96; IFI = .96; SRMR = .065]. All factor loadings were significant with  $z$ -values greater than 1.96, thus, suggesting that each item significantly

contributed to the measurement of its underlying construct (Jöreskog & Sörbom, 1989). Finally, covariances between relatedness and autonomy (.41), competence and relatedness (.28), and competence and autonomy (.17) were all significant.

### *Positive and Negative Affect*

To assess positive and negative affect, the participants responded to nine adjectives identified by Diener and Emmons (1984). This scale consists of four positive affect adjectives (happy, pleased, joyful, enjoy/fun) and five negative affect adjectives (unhappy, angry/hostile, frustrated, worried/anxious, depressed). Participants were requested to rate each adjective using the precursory stem “*What extent did you experience the following emotions during the experimental task?*” Responses were made as to the frequency that each emotion was experienced during the experiment on a 7-point scale ranging from 1 (not at all) to 7 (extremely). Alpha coefficients for the positive and negative affect subscales were .88 and .74, respectively. For the purpose of analyzing the SEM model, we randomly created two parcels for the positive affect (two parcels of two items) and negative affect (one parcel of two items and one parcel of three items) subscales. These parcels were used as indicators of the latent variables.

### *Subjective Vitality*

To assess subjective vitality, four items of the Subjective Vitality Scale (Ryan & Frederick, 1997) were used. Assessing the level to which the participants felt vigorous and alert, this scale incorporates items such as “At this moment I feel alive and vital.” Responding to the stem “How do you feel right now . . .” responses were rated on a seven-point scale ranging from 1 (not at all true for me) to 7 (very true for me). In the present work, the alpha coefficient for this scale was .87. For the purpose of analyzing the SEM model, we randomly created two parcels of two items. The parcels were used as indicators of the latent variable.

### *Manipulation Check Inventory*

A 15-item questionnaire was developed in order to assess the degree to which the participants found the experimental setting to be task-involving (six items, e.g., “trying hard to improve was important” and “the experimenter had us focus on doing our best”), ego-involving (five items, e.g., “winning was emphasized” and “the focus was on being the best”), and cooperative (four items, e.g., “working together was emphasized” and “the focus was on working together and cooperating”). Responses were made using the stem “In today’s experiment . . .” on a five-point scale anchored from 1 (strongly disagree) to 5 (strongly agree). To

examine the participants' degree of subjective success, participants were asked to respond to a single item that asked them if they considered their performance to be 2 (good) or 1 (bad).

Because this inventory was developed for the present study, we subjected the items to a CFA. Results revealed the proposed measurement model to be adequate [ $\chi^2(87) = 181.64, p < .001$ ; CFI = .94; IFI = .94; SRMR = .068]. All factor loadings were significant with z-values greater than 1.96, thus, suggesting that each item significantly contributed to the measurement of its underlying construct (Jöreskog & Sörbom, 1989). Further, alpha coefficients showed the items comprising the ego-involving ( $\alpha = .90$ ), task-involving ( $\alpha = .75$ ), and cooperative ( $\alpha = .91$ ) subscales to be reliable.

### Procedure

Prior to the collection of data, ethical consent to conduct the study was obtained from the researchers' School Human Subjects Committee. Approximately one week prior to the experiment, the participants completed a general background questionnaire (i.e., assessing previous experience with co-ordination tasks) and a written consent form. Results revealed no participant to have previously engaged in the experimental task. Accordingly, the task was considered *novel* for all.

Having been randomly assigned to an individual/two-person team task condition (and in the case of two-person teams, a partner), participants arrived at the laboratory and were randomly assigned to one of the four competitive environment conditions. Each entailed the participant(s) to compete on the task against the other individual or two-person team in the laboratory at the same time. However, the lab was arranged so that the competitor(s) could not see their opponent(s) and his/her actual ability during the competition. Participants were introduced to the task by a same-sex experimenter. Following the initial task introduction, all following inductions were given by pre-recorded tapings to both facilitate consistency in the manipulations and to diminish the potential influence of interpersonal factors (e.g., experimenter's mood, tone of voice, etc.).

Before the competitive trials commenced, the participants performed the co-ordination task two times in order to acquaint themselves with the activity. Participants in the four conditions then performed two experimental trials. Within all conditions, the participants were given "bogus" feedback after the first and second trials. In each instance, one participant or one two-person team won both or lost both trials.

To introduce and emphasize to all participants the meaningfulness of the co-ordination task, a standard introduction (below) was used:

Previous research has shown the co-ordination task that you are about to perform to be an accurate indicator of co-ordination ability. Co-ordination is an integral aspect of most sports, and your score on this task will reveal your level of ability on this important attribute.

While the introduction to the task was identical for all four competitive conditions, subsequent instructions differed. The four competitive conditions were manipulated in the following ways.

### *Ego-Involving Individual*

In this condition, two participants competed directly on the co-ordination task. The participants were instructed, by the pre-recorded tape to:

compete against your opponent to see who is the best at the task. At the end of each trial you will receive a score that will tell you if you won or lost the trial. Your scores will then be tabulated and compared against other students and subsequently displayed on the school website and on the school notice board. Once again, the goal here is to score high and beat your opponent . . . do what you can to win and have the highest score that's what your goal should be . . .

Competitive outcome was verbally announced following trial 1. As indicated earlier, this information was pre-determined so that the participant was in either a win/win or lose/lose situation. After the outcome feedback, participants were told:

. . . we are now going to conduct the second trial. Please remember that you are competing against your opponent to see who is the best at the task and possesses greater co-ordination ability. At the end of this trial you will again receive a score telling you if you won or lost the trial. Your scores will then be tabulated and compared against other students in your group and displayed on the school website and on the school notice board

Following the provision of the competitive outcome information for trial 2, participants responded to a multi-section inventory.

### *Ego-Involving Two-Person Team*

In this condition, the participants were performing the task in pairs with the scores being combined to give a team score. Thus, each two-person team co-ordinated their efforts in a direct competition against another two-person team. The participants were instructed as follows:

. . . Your group will compete against the other group at the task and your scores will be added and compared. At the end of each trial you will receive feedback from one of the experimenters that will tell you if your group won or lost the trial. Your scores will then be tabulated and compared against other groups and displayed on the school website and on the school notice board. Again, the aim is to score high and beat the opposing group. Please remember you are competing against the other group . . . the goal here is to score high and beat the opposing group . . . do what you can to win and have the highest score. That's what your goal should be . . .

Pre-determined (win/loss) competitive outcome was verbally announced following trial 1. After the manipulated outcome feedback, participants were told:

. . . we are now going to conduct the second trial. Please remember that you are competing against the other group to see which group is the best at the task and possesses greater

co-ordination ability. At the end of this trial you will again receive a score telling you if your group won or lost the trial. Your scores will then be tabulated and compared against other groups and displayed on the school website and on the school notice board. . .

Following the provision of the competitive outcome for trial 2, participants responded to a multi-section inventory.

### *Task-Involving Individual*

Similar to the ego-involving individual condition, participants competed individually against each other. The emphasis in this condition, however, was on doing one's personal best and improving one's performance rather than outperforming the other participant. The condition was characterized by a strong emphasis towards putting forth effort and learning. Instructions after the baseline trials were:

. . . you will now complete two trials and your score will be compared with the other participant. However, the score is not the main issue here. The important thing is that you try the best you can, and that you try hard to improve your own performance. Try to be very focused in order to be able to do the steps as well as you possibly can . . . Remember that the score is not the main issue here, the important thing is that you try the best you can, and that you try hard to improve your own performance. Try to be very focussed in order to be able to do the steps . . .

After the first competitive trial, participants received a written (private) feedback sheet, which allowed them to know how they compared to their fellow competitor. Participants were then asked to try and improve their personal score during trial 2. The following instructions were given:

We are now going to conduct the second trial. You know how you did on the first trial . . . giving it your 'best shot' is the aim for this second trial. Focussing and trying are the keys for success. In other words, the score is not the main issue here, the important thing is that you try the best you can, and that you try hard to improve your own performance. Try to concentrate the best you can on the steps that are needed. . .

Following trial 2, both participants received a personal feedback sheet indicating the competitive outcome. Moreover, both participants were told that they had improved their score from trial 1. Following this feedback, participants responded to a multi-section inventory.

### *Task-Involving Two-Person Team*

In this competitive condition, the participants worked in pairs and, in contrast to the ego-involving two-person team condition, were encouraged to cooperate when performing the task while competing against the other team. Instructions after baseline for this condition were:

. . . working in pairs with your partner, the task entails that each of you try to cover at least 3 of the sensor pads. Yes, the aim is to co-ordinate your efforts while you do this co-ordination task. Don't hesitate to use verbal instructions to help you work together to

get the best score that you can get as a team. You will have one-minute to decide the most effective way that you and your team-mate can complete the task. Try to think of effective strategies. You will complete 2 trials and your score will be compared with the other pair who are also performing the task. However, winning and losing the trial is not what is important here, giving it your best shot and trying to work together as a team is what really matters. Remember, try to focus on cooperating and doing the best you can, a good effort and collaboration are the keys . . . So, once again, you will complete 2 trials after each trial we will look at how the other team is doing and compare scores. But we don't want you to get 'hung-up' on the outcome. Use this information for helping your team be even better and try even harder next time. Remember, the most important thing is that you give it your best effort and work together well as a team.

Private competitive outcome feedback was provided following trial 1. Before completing trial 2, participants were given the following instructions:

. . . We are now going to conduct the second trial. The key here is to try and improve and work together as a team . . .

Having received written (private) competitive outcome feedback for trial 2, participants then responded to a multi-section inventory.

### Post Experiment Assessments

Following the second trial, participants were requested to complete a multi-section inventory assessing their need satisfaction, subjective vitality, and positive and negative affect valence. Also at this time, participants completed a 15-item inventory assessing the degree to which they perceived the climate to be ego-involving, task-involving, and cooperative. They also responded to a single item tapping subjective success.

### Data Analyses

Initially, descriptive statistics for all variables were computed and Cronbach's (1951) alpha coefficients calculated to assess the internal reliability of the multi-item subscales. Via analysis of variance (ANOVA), potential gender differences were explored. At this time psychometric tests (i.e., confirmatory factor analysis) were also conducted on the study questionnaires.<sup>8</sup>

The present study incorporated two manipulation checks. The first to verify that the participants had differing perceptions of the experimental environment as a function of the condition that they were exposed to (three one-way ANOVA

<sup>8</sup>In addition to the two CFAs reported in the text, results of CFAs on the positive affect [ $\chi^2(2) = 2.01$ ,  $p > .05$ ; CFI = 1.00; IFI = 1.00; SRMR = .013] negative affect [ $\chi^2(5) = 17.53$ ,  $p < .01$ ; CFI = .95; IFI = .95; SRMR = .046] and vitality [ $\chi^2(2) = .67$ ,  $p > .05$ ; CFI = 1.00; IFI = 1.00; SRMR = .010] subscales revealed acceptable factorial validity. Details of the factor solution, factor loadings, co-variances, and error residuals are available from Martyn Standage.



analyses) and the second to assess that perceptions of success were congruent with outcome feedback (using an independent *t*-test).

A  $2 \times 2 \times 2$  (single/cooperative setting  $\times$  ego/task involving setting  $\times$  win/lose outcome) multivariate analyses of variance (MANOVA) was performed to ascertain whether the groups differed in scores on *need satisfaction* and indices of SWB. Follow-up univariate *F* tests were used to examine between group differences. Effect sizes were calculated to assess the meaningfulness of any experimental group differences. Due to the unequal sample sizes, the pooled standard deviation ( $M_1 - M_2/SD_{\text{pooled}}$ ) of the comparison groups was used as the measure of group variability (*g*; Hedges, 1981). Consistent with the standards advocated by Cohen (1988) for the social and behavioral sciences, an effect size of 0.2 is considered small, 0.5 moderate, and 0.8 and above large. Finally, contrast analyses were conducted to test our hypotheses pertaining to the conditions under which losing is most detrimental to need satisfaction and indices of SWB (Table I).

The adequacy of the hypothesized *motivational processes* path model was assessed using AMOS (Version 5.0; Arbuckle, 2003). The overall fit of a model to the data is examined using the Chi-square test ( $\chi^2$ ). A non-significant  $\chi^2$  indicates the model to be an acceptable fit to the sample data. Given that the  $\chi^2$  statistic is strongly influenced by sample size (Marsh, Balla, & McDonald, 1988), we assessed additional indices of fit. In view of our relatively small sample ( $n \leq 200$ ), we chose to examine the Standardized Root Mean Square Residual (SRMR) as a measure of absolute fit together with two incremental fit indices, namely the Comparative Fit Index (CFI) and the Incremental Fit Index (IFI). These indices of fit were chosen as they are less sensitive to distributional assumptions and sample size than comparable indices which tend to over-reject true population models in small samples (i.e., TLI and RMSEA) (Hu & Bentler, 1999; West, Finch, & Curran, 1999).<sup>9</sup> For incremental indices such as the IFI and CFI, values of over .90 are indicative of an acceptable fit, whereas values of close to (or above) .95 represent an excellent fit between the model and data (Bentler, 1995; Hu & Bentler, 1999). For SRMR values of .08 (or lower) represent well-specified models (Hu & Bentler, 1999).

## RESULTS

### Preliminary Analyses

Mean values for the four competitive conditions by outcome are shown in Table I. With respect to potential gender differences, males and females did not significantly differ on any of the dependent variables. Further, gender did not

<sup>9</sup>Unlike data that has been analysed using the "bootstrapping" approach (e.g., Standage et al., 2003) our sample size did not permit such analyses (see Yung & Bentler, 1995 for a discussion).

interact with any independent variable. As such, data from the male and female participants were combined for further analyses.

### Manipulation Checks

To ascertain that participants had differing perceptions of cooperative, ego-involving, and task-involving structures as a function of which experimental condition they had been exposed, one-way ANOVAs were conducted. Results revealed significant differences between the four conditions for perceptions of ego-involving [ $F(3, 176) = 107.07, p < .001$ ], cooperative [ $F(3, 176) = 81.04, p < .001$ ] and task-involving [ $F(3, 176) = 4.89, p < .01$ ] structures. Tukey HSD pairwise comparisons were used to decompose the univariate effect. Results revealed that participants exposed to the ego-involving conditions (ego-involving-individual and ego-involving two-person teams) perceived the experimental climate to be more ego-involving than participants exposed to the task-involving manipulations (task-involving-individual and task-involving two-person teams) ( $p < .001$ ;  $M_s = 4.43$  and  $2.68$ , respectively). Likewise, participants who worked together in a group (task-involving two-person teams and ego-involving two-person teams) perceived the experimental climate to be more cooperative than those participants who worked individually (task-involving individual and ego-involving individual) ( $p < .001$ ;  $M_s = 3.76$  and  $2.09$ , respectively). Participants assigned to the task-involving individual condition perceived the experimental climate to place more emphasis on task-involving cues than the ego-involving conditions ( $p < .01$ ;  $M_s = 4.04$  and  $3.61$ , respectively). In terms of the competitive outcome manipulation, participants who were told that they had won rated themselves more successful than those who were told that they had lost,  $t(178) = 8.44, p < .001$  ( $M_s = 1.93$  and  $1.43$ , respectively).

### Experimental Condition Differences

Significant multivariate main effects on need satisfaction and indices of SWB emerged for ego/task involving competitive climate [Wilks' lambda = .94,  $F(4, 169) = 2.62, p < .05$ ], competitive outcome [Wilks' lambda = .76,  $F(4, 169) = 13.49, p < .001$ ], and cooperative structure [Wilks' lambda = .91,  $F(4, 169) = 4.19, p < .01$ ]. Follow-up ANOVAs revealed that the participants' reported levels of need satisfaction, positive affect, negative affect, and vitality differed significantly due to the experimental condition that they had been exposed. No significant interactions emerged.

The main effect for the situational goal emphasis (task/ego) revealed that participants exposed to the task-involving conditions reported significantly higher levels of need satisfaction,  $F(1, 172) = 4.15, p < .05$  ( $g = .30$ ) and vitality,

$F(1, 172) = 5.45$ ,  $p < .05$  ( $g = .34$ ) than participants exposed to the ego-involving conditions. For negative affect, participants in the ego-involving conditions reported significantly higher levels of negative affect,  $F(1, 172) = 5.44$ ,  $p < .05$  ( $g = .33$ ). The groups did not differ significantly with respect to reported positive affect,  $F(1, 172) = 2.33$ ,  $p > .13$  ( $g = .19$ ).

For the competitive outcome main effect, participants who were told that they had won the competitive trials reported significantly higher levels of need satisfaction,  $F(1, 172) = 47.01$ ,  $p < .001$  ( $g = .78$ ), positive affect,  $F(1, 172) = 12.54$ ,  $p < .001$  ( $g = .57$ ), and vitality,  $F(1, 172) = 22.10$ ,  $p < .01$  ( $g = .69$ ), than those informed they had lost the competitive trials. Conversely, participants who were told that they had lost the competitive trials reported significantly higher levels of negative affect than those told that they had won the trials,  $F(1, 172) = 7.61$ ,  $p < .01$  ( $g = .38$ ).

With respect to the main effect for cooperative structure, participants in the two-person team [cooperative] conditions reported significantly higher scores for need satisfaction,  $F(1, 172) = 13.93$ ,  $p < .001$  ( $g = .47$ ), positive affect,  $F(1, 172) = 5.96$ ,  $p < .05$  ( $g = .33$ ), and vitality,  $F(1, 172) = 6.96$ ,  $p < .01$  ( $g = .36$ ) than participants who competed individually. Contrary to our hypothesis, those who worked individually did not report significantly higher scores for negative affect,  $F(1, 172) = 2.22$ ,  $p > .13$  ( $g = .19$ ).

Despite the presence of no significant interactions, we tested three theoretically derived planned contrasts, focusing on the question of *when is losing worse?* (see Table I).

### *Contrast 1*

Participants that lost in the ego-involving conditions reported significantly higher negative affect than those who lost in a task-involving condition,  $t(172) = -2.48$ ,  $p < .01$  ( $g = .46$ ). Moreover, reported need satisfaction,  $t(172) = 1.91$ ,  $p < .06$  ( $g = .39$ ), positive affect,  $t(172) = 1.91$ ,  $p < .06$  ( $g = .33$ ), and vitality,  $t(172) = 2.06$ ,  $p < .05$  ( $g = .43$ ) were lower among those who lost in an ego-involving condition when contrasted to those who lost in a task-involving condition.

### *Contrast 2*

Participants who lost in an individual condition reported significantly higher negative affect than those who lost in a two-person team setting,  $t(172) = -2.16$ ,  $p < .01$  ( $g = .40$ ). Further, reported levels of need satisfaction,  $t(172) = 3.16$ ,  $p < .01$  ( $g = .62$ ), positive affect,  $t(172) = 2.02$ ,  $p < .05$  ( $g = .42$ ), and vitality,  $t(172) = 2.12$ ,  $p < .05$  ( $g = .46$ ) were significantly lower in the case of participants who lost individually than those who lost in a two-person team setting.

*Contrast 3*

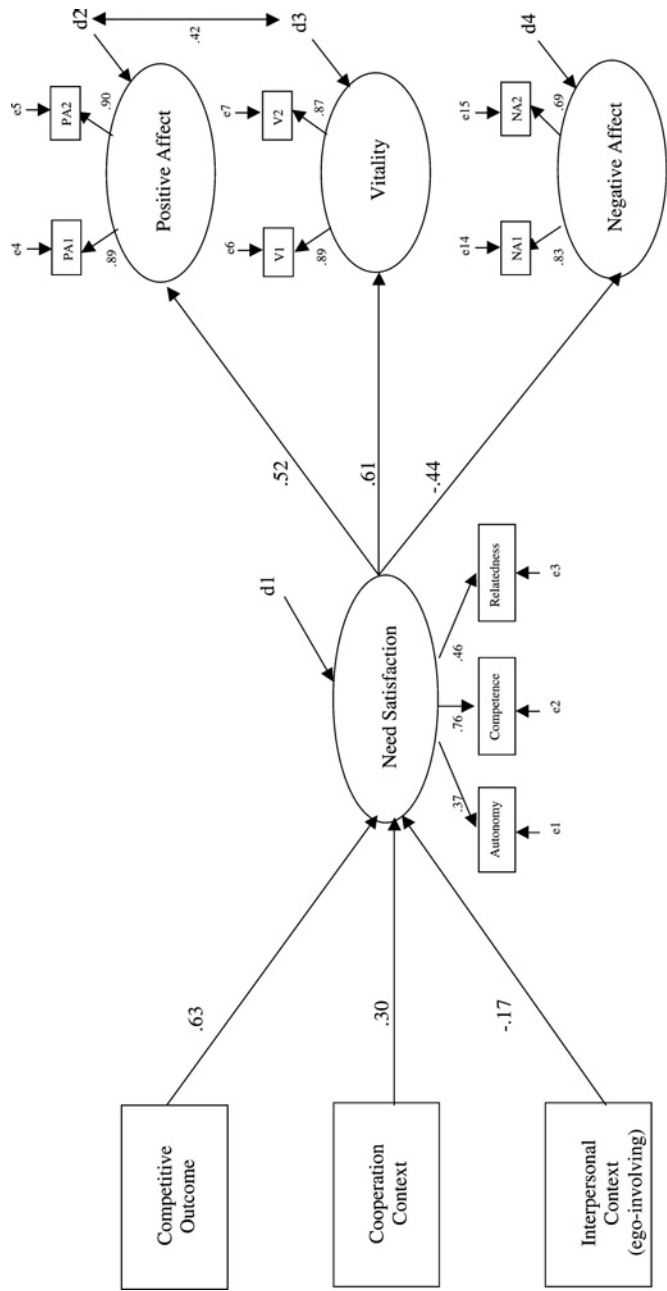
Participants who lost in the ego-involving individual condition reported significantly higher negative affect than those who lost in the ego-involving two-person team condition,  $t(172) = -2.00$ ,  $p < .05$  ( $g = .46$ ). Moreover, the levels of reported need satisfaction,  $t(172) = 2.22$ ,  $p < .05$  ( $g = .63$ ), positive affect,  $t(172) = 3.14$ ,  $p < .01$  ( $g = .89$ ), and vitality,  $t(172) = 1.92$ ,  $p < .06$  ( $g = .55$ ) reported by participants who lost in the ego-involving individual condition were significantly lower than their counterparts who lost in the ego-involving two-person team condition.

**Motivational Processes Model**

We initially evaluated the multivariate normality of the data using Mardia's multivariate kurtosis coefficient. Results revealed the data to deviate from normality (Mardia's multivariate coefficient = 11.91). Given that sample size and distributional assumptions guided our selection of fit indices, we proceeded to analyze the data using the maximum likelihood (mle) method.

Due to concerns regarding the ratio of sample size to estimated parameters, we used the parceling technique rather than adopting a full latent model approach. Item parceling represents "a simple sum of several items assessing the same construct. Several parcels are developed from items constituting a scale; no item is assigned to more than one parcel and all scale items are used in constructing the parcels" (Kishton & Widaman, 1994, p. 757). To this end, we randomly created parcels of items to form two indicators for each latent factor. In addition to reducing the estimated parameter/sample size ratio of the measurement model via cutting the number of indicators, this approach should lead to more precise parameter estimates and is more reliable than adopting a single indicator approach (Bandalos & Finney, 2001; Marsh, Richards, Johnson, Roche, & Tremayne, 1994). With respect to the former benefit, our estimated parameter/sample size ratio of 6.4/1 exceeded the recommended ratio of five participants to each estimated parameter (Bentler, 1995).

Results [ $\chi^2(50) = 107.19$ ,  $p < .001$ ; CFI = .92; IFI = .92; SRMR = .060] showed the hypothesized covariance structure to adequately fit the data (Fig. 1). Moreover, the standardized indirect effects indicated that competitive outcome positively influenced positive affect ( $\beta = .33$ ,  $p < .01$ ) and vitality ( $\beta = .39$ ,  $p < .01$ ) and negatively impacted negative affect ( $\beta = -.28$ ,  $p < .01$ ) through need satisfaction. Through need satisfaction, a cooperative task structure positively predicted vitality ( $\beta = .19$ ,  $p < .01$ ) and positive affect ( $\beta = .16$ ,  $p < .01$ ) and negatively predicted negative affect ( $\beta = -.13$ ,  $p < .01$ ). Finally, a competitive environment that was deemed more controlling (ego-involving) had a positive impact on negative affect ( $\beta = .08$ ,  $p < .05$ ) and a negative influence



Note. Solid lines represent significant parameter estimates (i.e., their z scores are greater than 1.96). Circles represent latent variables and squares represent measured variables. Numbered, shortened named variables are the indicators of the latent factors.

**Fig. 1.** Standardized solution for the motivational processes model.

on vitality ( $\beta = -.11, p < .05$ ) and positive affect ( $\beta = -.09, p < .01$ ) through need satisfaction.

## DISCUSSION

In this study we explored the effect that four competitive conditions (varying in their degree of task- and ego-involving features and the structure of the competitive task; i.e., one-on-one or involving two-person teams) *and* competitive outcome had on the need satisfaction and SWB responses of participants performing a physical co-ordination task. Our results largely supported our stated hypotheses and the supplementary planned contrasts. A second purpose was to examine, employing SEM, a model of motivational processes based on the tenets of SDT. Results supported a model in which cooperation and competitive outcome positively predicted, whereas an ego-involving condition negatively predicted, the satisfaction of participants' basic needs. Need satisfaction, in turn, led to enhanced positive affect and vitality, and negatively predicted negative affect.

### Experimental Condition Differences

Aligned with our hypothesis, participants who were exposed to a task-involving condition reported higher levels of need satisfaction and vitality than those exposed to an ego-involving condition. No differential pattern emerged for positive affect. With respect to need satisfaction, our results are consistent with the findings of Sarrazin et al. (2002) who found that subjective perceptions of a task-involving context positively corresponded to reported autonomy, competence, and relatedness among competitive female handball players. The positive relationship between a task-involving structure and reported need satisfaction may be explained by the theoretical presumption that, in such a condition, individuals are more likely to hold an internal locus of causality, consider the task/activity to be an end in of itself, and derive subjective success from trying their best and improving on their previous performance(s) (deCharms, 1968; Nicholls, 1989; Ryan, 1982). In finding subjective vitality to be enhanced in a task-involving competitive climate (as opposed to a more ego-involving competitive situation) ( $g = .34$ ), the present results are consonant with our hypothesis and past work (Nix et al., 1999).

Nicholls (1989) has argued that when individuals engage in evaluative, interpersonal settings that induce public self-awareness (i.e., ego-involving environments), they are likely to evaluate their performance in terms of whether they are able to demonstrate superior ability over others and their achievement strivings are merely the means to an end. Ryan (1982) proposed that individuals are likely to equate success and failure with their self-worth when exposed to ego-involving environments. Both viewpoints emphasize the controlling nature that a focus on "winning" or "performing well" holds as individuals experience pressure

to enhance/up-hold their relative standing. In the current study, participants in the ego-involving conditions reported significantly higher levels of negative affect and lower levels of need satisfaction and vitality than those exposed to the task-involving conditions. Such a finding makes intuitive sense as negative affect is likely to be induced when people are more concerned about their performance, and perceive the competitive outcome to have implications regarding how they judge themselves (i.e., self-worth judgements; Reinboth & Duda, 2004; Ryan, 1982). Our findings are also conceptually aligned with SDT, as more controlling (in this case, more ego-involving) environments are expected to thwart need satisfaction and undermine positive SWB responses (cf. Deci & Ryan, 2000).

Consistent with previous work and our stated hypothesis, participants' responses varied according to whether they had won or lost both competitive trials (e.g., Reeve & Deci, 1996; Vallerand et al., 1986a). More specifically, participants who were told that they had "won" the two competitive trials reported higher levels of need satisfaction, positive affect, and vitality than those told that they had "lost" the competitive trials. Conversely, participants that were informed that they had "lost" reported higher levels of negative affect. In addition to being statistically significant, the calculated effect sizes revealed the differences between "winners" and "losers" to be meaningful. As such, it appears that receiving positive feedback via competitive outcome is not only pertinent to perceived competence and intrinsic motivation (McAuley & Tammen, 1989; Reeve & Deci, 1996; Vansteenkiste & Deci, 2003), but also to overall need satisfaction and positive SWB responses. Equally consonant with our hypothesis, the repercussions of receiving negative outcome feedback (i.e., "you lost") served to enhance negative affect.

Congruent with our hypothesis, participants in the two-person team conditions reported significantly higher scores for need satisfaction, positive affect, and vitality than those who worked individually. These findings support the stance that psychological health is likely to be enhanced in situations whereby individuals cooperate and work together towards a common goal (Johnson & Johnson, 1989, 1998). Moreover, the results corroborated our hypothesis that cooperative tasks/structures may hold important implications for the satisfaction of the basic needs ( $g = .47$ ).

In the present work, we also chose to test three hypotheses that focused on the effect of losing under different circumstances (Contrasts 1–3). Specifically, the first contrast explored the effects of losing in an ego-involving [individual or two-person team] as opposed to a task-involving [individual or two-person team] condition (Contrast 1). Consistent with our hypothesis, participants who lost in the ego-involving conditions reported significantly higher levels of negative affect and significantly lower need satisfaction, positive affect, and vitality than those losing in either of the task-involving conditions. Supported by moderate effect sizes, this pattern of findings suggests that a focus on inherent aspects of the task such as trying hard and improving upon one's previous performance may serve to buffer the negative effects of losing at a competitive physical task.

Our second supplementary analysis contrasted the effect of losing in an individual condition as opposed to a two-person team (irrespective of whether the loss occurred in a task versus ego-involving condition) (Contrast 2). Aligned with our hypothesis, participants who lost individually reported significantly higher levels of negative affect and significantly lower need satisfaction, positive affect, and vitality than those losing in a two-person team. Corroborated by moderate effect sizes, this finding suggests that when working in cooperation with another to secure a positive competitive outcome, individuals can still have their needs met and experience SWB despite being objectively unsuccessful. The underpinning mechanisms accounting for such findings warrant further investigation, however. For example, do individual's maintain need satisfaction and corresponding feelings of SWB due to sharing the responsibility of the loss, via the opportunity to offset the potential threat to self-worth by attributing unsuccessful performance to a partner (i.e., self-handicapping), or is it the various positive social aspects embedded within the cooperative exchange that permit adaptive responses in the face of failure?

Finally, we explored the effect of losing individually in an ego-involving setting as opposed to in the two-person team ego-involving condition (Contrast 3). We expected that those who lost in the individual condition would report lower scores for need satisfaction, positive affect and vitality and higher levels of negative affect. Findings were consonant with these predictions. The fact that these differences in need satisfaction and affective responses occurred when participants lost individually as opposed to collectively suggests that the negative repercussions of ego-involving climates are exacerbated when one has sole responsibility for the "failure," as opposed to when an undesirable outcome can be shared. Interestingly, the responses made by the participants losing in the ego-involving two-person team condition were not too dissimilar to those reported by the participants who lost in the task-involving individual condition (see Table I). Collectively, these findings suggest that losing in an ego-involving context may not be especially detrimental should one be part of a cooperative effort.

All in all, the results as they pertain to the effects of task versus ego involving competitive conditions are largely consistent with the theorizing of achievement goal theorists (Ames, 1992a; Nicholls, 1989), past work rooted in cognitive evaluation theory (Nix et al., 1999; Ryan, 1982), and extant research focused on cooperative learning (Johnson & Johnson, 1989, 1998). From a practical perspective, the findings support the advancement of strategies to promote task-involvement as opposed to ego-involvement (Ames, 1992a, 1992b) and where possible cooperative interactions (Johnson & Johnson, 1989, 1998).

According to SDT, self-determined motivation is enhanced when feedback (whether positive or negative) has informational significance pertaining to his or her competence and is provided in a relatively supportive way (Deci & Ryan, 2000). The current results revealed that participants who worked in a task-involving condition in cooperation with a confederate, did not report decrements in negative



affect as a function of losing to the same degree as participants who lost in the other three conditions (see Table I). These findings suggest that cooperative coupled with task-involving structures (Ames, 1992a) to be most motivationally adaptive, particularly when individuals are facing objective failure.

### **Motivational Processes Model**

The proposed model (Fig. 1) demonstrated an adequate fit to the data and supported the sequence of relationships posited by SDT. Aligned with the tenets of basic needs theory (Ryan & Deci, 2000), need satisfaction positively predicted vitality and positive affect. The present findings, therefore, extend and corroborate past cross-sectional studies (e.g., Baard et al., 2000; Deci et al., 2001) by demonstrating need satisfaction to be positively related to indices of SWB in an experimental setting. A negative association emerged between need satisfaction and negative affect. Such a finding is equally congruent with Ryan and Deci's prediction that when the basic needs are deprived, negative affective responses are more likely to transpire.

One of the appealing features of Deci and Ryan's basic needs approach is that it provides insight into how to induce increments in SWB. SDT holds that social contexts that satisfy the innate psychological needs serve as critical antecedents to enhanced SWB, self-motivation, and optimal functioning. Supporting this premise, the standardized indirect effects showed that various social factors (in this case, competitive conditions) significantly influence SWB through need satisfaction. In the present work, the SEM model revealed competitive outcome and cooperation to positively predict, and an ego-involving condition to negatively predict, need satisfaction. Accordingly, our findings support the theoretical tenets of SDT and highlight the importance of environments that promote, rather than diminish, need satisfaction.

### **CONCLUSION**

In conclusion, the findings provide support for the validity of the theoretical tenets proposed by SDT as well as achievement goal and cooperative learning frameworks. Indeed, drawing from the experimental data, the present research provides evidence for the veracity of adopting a needs-based approach to the study of SWB. The current study also indicates that competition per se is not necessarily threatening to the satisfaction of basic psychological needs and associated indices of well-being. Rather, it seems that losing in an ego-involving competitive structure that centers on individual-based achievement can be the most costly competitive encounter. Even when "failure" is realized, the present findings suggest that need satisfaction and the quality of the experience

can be maintained when the competition is couched in a task-involving manner and/or cooperation is promoted. As it is difficult to always be the winner when involved in competition, such findings are reassuring and informative with respect to how potential debilitating effects of competition can be countered.

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